Remarks

1.   In response to communications filed on 6 April 2010, claims 1-17 are pending in the application.

EXAMINER'S AMENDMENT

2.   An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Joseph D'Angelo (Reg. No. 56,800) on 15 June 2010.

3.   In Claims:

Please replace claims 1-17 with amended claims 1-17 as follows:

1. (Currently Amended): A software agent failure tolerant computer architecture for managing resources for transfer of data stored in a data storage environment including at least two data storage systems, <u>and wherein data is replicated from one of the at</u> <u>least two data storage systems to at least one other data storage system of the at least</u> <u>two data storage systems,</u> the architecture comprising:

A data transfer server;

a primary software agent one or more primary software agents hosted on said

data storage system comprising independent storage devices, said primary software

agent[,] in communication with the data transfer server, the primary software agent

configured for performing to perform data transfer operations in response to commands

from the data transfer server;

one or more failover software agents, each failover software agent residing on a

host that is different from each other failover software agent and each primary software

agent, in communication over a network with the primary software agents, the data

transfer server, and at least one of the two data storage systems, the failover software

agents being remote from the primary software agent and wherein each of said failover

software agents is configured to execute scripts residing on the host a host with one of

the primary software agents or one of the failover software agents to control host

applications, wherein said primary software agent further represents a failover software

agent for another of said primary software agents in another one of said data storage

systems;

a failover protocol for determining an order in which said primary software agents

and said failover software agents, within a communication path of a data transfer, are

designated to take over the data transfer operation and the primary software agent or

failover software agent designated to take over the data transfer operation executes

scripts residing on the a host with a failed primary software agent to control host

applications residing on the host with the failed primary software agent transparent to

replications running to put the replication data in condition for the designated primary

software agent or designated failover software agent to push and pull replication data

during the replication in response to one or more data transfer commands when a

failure of one or more of said primary software agents or said failover software agents is

determined, said protocol being determined during a configuration of said computer

architecture.

2. (Original) The architecture of Claim 1, where the data transfer operation is a

replication of data within the data storage environment.

3. (Currently Amended) The architecture of Claim 1, wherein server commands to the

primary software agents and failover software agents are sent over a network in

accordance with an IP protocol.

4. (Currently Amended) The architecture of Claim 1, wherein the primary software

agents and failover software agents communicate with the at least one data storage

system over the network in accordance with a Fibre Channel protocol.

5. (Currently Amended) The architecture of Claim 1, wherein a predetermined hierarchal

relationship is followed by the data transfer server to select the order in which the

failover software agents are commanded to take over the work data transfer of the one

or more determined failed primary software agents or failover software agents.

6. (Currently Amended) A software agent failure tolerant computer architecture for managing resources for replication of data stored in a data storage environment including at least two data storage systems, and wherein data is replicated from one of the at least two data storage systems to at least one other data storage system of the at least two data storage systems, the architecture comprising:

a data replication management server;

a software agent, one or more software agents, designated as primary software agents, hosted on said data storage system, said data storage system comprising independent storage devices, said primary software agents [,] in communication with at least one of the two data storage systems and the data replication management server, the primary software agents configured for performing to perform data replication operations in response to commands from the data replication management server;

One or more failover software agents, each failover software agent residing on a host that is different from each other failover software agent and each primary software agent, in communication over a network with at least one of the primary software agents, the data replication management server, and at least one of the two data storage systems, the failover software agents being remote from the primary software agents and wherein each of said failover software agents is configured to execute scripts residing on the host a host with one of the primary software agents or one of the failover software agents on the host to control host applications, wherein said primary software agent further represents a failover software agent for another of said primary software agents in another one of said data storage systems;

a failover protocol for determining an order in which said primary software agents

and said failover software agents, within a communication path of a data transfer, are

designated to take over the data transfer operation and the primary software agent or

failover software agent designated to take over the data transfer operation executes

scripts residing on the host with a failed primary software agent to control host

applications residing on the host with the failed primary software agent transparent to

replications running to put the replication data in condition for the software agent to

push and pull replication data during the replication in response to one or more data

transfer commands when a failure of one or more of said primary software agents or

said failover software agents is determined, said protocol being determined during a

configuration of said computer architecture.

7. (Currently Amended) The architecture of Claim 6, wherein server commands to the

primary software agents and the failover software agents are sent over a network in

accordance with an IP protocol.

8. (Currently Amended) The architecture of Claim 6, wherein the primary software

agents and the failover software agents communicate with the at least one data storage

system over the network in accordance with a Fibre Channel protocol.

9. (Currently Amended) The architecture of Claim 6, wherein the data replication

management server uses a predetermined hierarchal relationship to select the order in

which designated ones of the failover software agents are commanded to take over the

~~work~~ data transfer of the one or more determined failed primary software agents or

failover software agents.

10. (Currently Amended) A method for managing fault-tolerant resources for replication

of data stored in a data storage environment including at least two data storage

systems, and wherein data is replicated from one of the at least two data storage

systems to at least one other data storage system of the at least two data storage

systems, and at least one software agent in communication with at least one data

replication management server for managing the fault tolerant resources, the method

comprising:

configuring one or more software agents as failover agents, each failover

software agent residing on a host that is different from each other software agent, that

are in remote communication over a network with ~~another~~ at least one other software

agent [,] designated as a primary software agent, and wherein each of said failover

software agents is configured to execute scripts residing on ~~the host~~ a host with one of

the primary software agents or one of the failover software agents to control host

applications, ~~which~~ ~~which is also~~ the host being in communication with the data

replication management server, and at least one of the two data storage systems,

wherein said primary software agent further represents a failover software agent for

another of said primary software agents in another one of said data storage systems;

establishing a failover protocol for determining an order in which said software

agents, within a communication path of ~~the~~ a data transfer, are designated to take over

the data transfer ~~operation~~ and the <u>primary</u> software agent <u>or the failover software agent</u>

designated to take over the data transfer operation executes scripts residing on the host

with a failed primary software agent to control host applications <u>residing on the host with</u>

<u>the failed primary software agent</u> ~~transparent to replications running~~ <u>to put the</u>

<u>replication data in condition for the software agent to push and pull replication data</u>

<u>during the replication</u> in response to one or more data transfer commands when a

failure of one or more of said software agents is determined, said protocol being

determined during configuration of said computer architecture.

11. (Previously Presented) The method of claim 10, wherein server commands to the

software agents are sent over a network in accordance with an IP protocol.

12. (Previously Presented) The method of claim 10, wherein the software agents

communicate with the at least one data storage system over the network in accordance

with a Fibre Channel protocol.

13. (Currently Amended) The method of claim 10, wherein the data replication

management server uses a predetermined hierarchal relationship to select the order in

which designated ones of the failover software agents ~~is~~ <u>are</u> commanded to take over

the ~~work~~ <u>data transfer</u> of the one or more determined failed software agents.

14. (Currently Amended) A software agent failure tolerant computer system for managing resources for replication of data stored in a data storage environment including at least two data storage systems, and wherein data is replicated from one of the at least two data storage systems to at least one other data storage system of the at least two data storage systems, the system comprising:

a data replication management server;

[a] at least one software agent, designated as a primary software agent, hosted on said data storage system, said primary software agent in communication with at least one of the two data storage systems and the data replication management server, the primary software agent configured for performing to perform data replication operations in response to commands from the data replication management server;

one or more failover software agents, each failover software agent residing on a host that is different from each other failover software agent and each primary software agent, in communication over a network with the primary software agent, the data replication management server, and at least one of the two data storage systems, the failover software agents being remote from the primary software agent and wherein each of said failover software agents is configured to execute scripts residing on the host a host with one of the primary software agents or one of the failover software agents to control host applications, wherein said primary software agent further represents a failover software agent for another of said primary software agents in another one of said data storage systems; and

a computer-executable program for carrying out a failover protocol for

determining an order in which said <u>primary</u> software agents and <u>said failover software</u>

<u>agents</u>, within a communication path of ~~the~~ <u>a</u> data transfer, are designated to take over

the data transfer ~~operation~~ and the <u>primary</u> software agent <u>or the failover software agent</u>

designated to take over the data transfer operation executes scripts residing on the host

with a failed primary software agent to control host applications <u>residing on the host with</u>

<u>the failed primary software agent</u> ~~transparent to replications running~~ <u>to put the</u>

<u>replication data in condition for the software agent to push and pull replication data</u>

<u>during the replication</u> in response to one or more data transfer commands when a

failure of one or more of said software agents is determined.

15. (Currently Amended) The system of Claim 14, wherein server commands to the

<u>primary</u> software agents <u>and the failover software agents</u> are sent over a network in

accordance with an IP protocol.

16. (Currently Amended) The system of Claim 14, wherein the <u>primary</u> software agents

<u>and the failover software agents</u> communicate with the at least one data storage system

over the network in accordance with a Fibre Channel protocol (see paragraph [0052]).

17. (Currently Amended) The system of Claim 14, wherein the data replication

management server uses a predetermined hierarchal relationship to select the order in

which designated ones of the failover software agents are commanded to take over the

work data transfer of the one or more determined failed primary software agents or

failover software agents.

Allowable Subject Matter

4.   Claims 1-17 are allowed.

The following is an Examiner's statement of reasons for allowance:

The cited prior art, alone or in combination, does not fully teach or suggest the

subject matter of the independent claims 1, 6, 10, and 14. The claim is directed towards

a failover system, wherein each primary or failover software agent exists on its own

host. When a host fails, the designated failover software agent runs scripts to manage

applications on the failed host that put the data in condition to be pushed or pulled

during a replication of the data. The cited prior art, alone or in combination, does not

provide this feature in combination with the remaining features of the independent

claims.

Any comments considered necessary by the Application should be submitted no

later than the payment of the issue fee and, to avoid processing delays, should

preferably accompany the issue fee. Such submissions should be clearly labeled

"Comments on Statement of Reasons for Allowance".

Conclusion

5.   Any inquiry concerning this communication or earlier communications from the

examiner should be directed to CHARLES D. ADAMS whose telephone number is

(571)272-3938. The examiner can normally be reached on 8:30 AM - 5:00 PM, M - F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Charles Rones can be reached on (571) 272-4085. The fax phone number

for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the

Patent Application Information Retrieval (PAIR) system. Status information for

published applications may be obtained from either Private PAIR or Public PAIR.

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For more information about the PAIR system, see http://pair-direct.uspto.gov. Should

you have questions on access to the Private PAIR system, contact the Electronic

Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a

USPTO Customer Service Representative or access to the automated information

system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/C. D. A./
Examiner, Art Unit 2164

/Charles Rones/

Supervisory Patent Examiner, Art Unit 2164